Effects of crowding on Temple Rhesus monkeys of Imphal, Manipur[1]

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(*With a text-figure and a photograph*)

Introduction

The rhesus monkeys are common in the cities, villages, forests and temples of northern India and have been intensively studied in this country. Little is known about the effects of overcrowding on the free ranging rhesus monkeys and their interactions with man when their home ranges overlap with human habitations. Southwick, Beg & Siddiqi (1961, 1965) have studied the social interactions of temple rhesus monkeys in northern India. Southwick (1967), and Alexander & Roth (1971) have studied the effects of crowding on the behaviour of rhesus and Japanese macaques respectively under captive conditions. Martin & Hilary Waterhouse (1971) reported the effects of population density in zoo monkeys. Oppenheimer (1973) reported the effects of environmental factors, specially high human density and intensive cultivation around home ranges, on the activity of village langurs in West Bengal.

A group of rhesus monkeys *Macaca mulatta* (Zimmermann) living in Mahabali temple of Imphal, the state capital of Manipur, consisting of a larger number of individuals presented an opportunity to the author to study the effects of overcrowding and interactions between man and monkeys and the observation and inferences are presented here.

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Ecology of the Study Area

Manipur is one of the eastern states of India, extending from 23°47′ and 25°41′ north latitudes and 93°60′ and 94°48′ east longitudes. It is bounded on the north by Nagaland, on the east by Burma and the west by Assam and on the south by Burma and Mizo Hills. The area of the state is 22,372 sq. km., out of which 1942 sq. km form the central valley of Manipur. The elevation of Imphal town is 762 m above the mean sea-level. The forests, mainly of sub-tropical type, are all scattered around the Imphal Valley and the majority of them are located in the hills. The valley consists of alluvial soil with drainage from north to south and enjoys a good climate. The period from November to February is characterised by low temperature and heavy dew at night. Frost is common on winter nights. In April and May temperature rises rapidly but the increasing heat is often moderated by the thunderstorms and light showers. The period from June to September is characterised by heavy rainfalls. The average rainfall is about 131 cm in the valley of which the maximum precipitation occurs in the months of July and August. Winter rainfall is sometimes heavy, often continuing for two to three days.

The range of temperature is generally from 35°F to 94°F with mean daily humidity of 81% in August and 49% in March at Imphal. The prevailing winds blow from the southwest with moderate velocity.

The Manipur Valley is inhabited by Manipuris who are orthodox Hindus by religion and the hills are occupied by various tribes. The population of Imphal, the study area, is about 300,000 with a density of 788 per sq. km. The Hindus form about 61.68% of the population of Imphal.

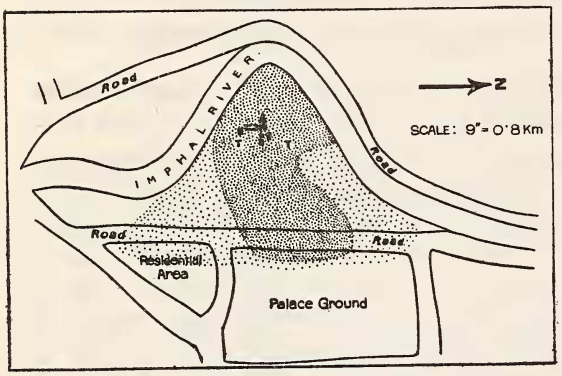

Fig. 1. Home range and core area of temple rhesus. The dotted area represents the total home range. The denser portion in the middle represents the core area. The temple is marked with solid black and other buildings with open squares. The two tanks are represented by the letter — T.

A big group of rhesus monkeys consisting of 128 individuals was located in the Mahabali temple at Imphal. This temple is situated on the south side of the city, in a well-populated area, at the eastern bank of Imphal river (Fig. 1). This river flows through the Chin Hills and the Kale Valley and discharges its water into the Chindwin river of Burma. Besides the temple, there are six other small to moderate-sized buildings, each consisting of one or two rooms. The buildings and the courtyard cover an area of about 28 sq. m. Two medium-sized tanks are located on the north and south sides of the temple courtyard (Fig. 1). The river runs north-south and there is a non-metalled road which runs along the bank, forming an embankment. Another non-metalled road runs almost parallel to this road and passing within a few feet of the temple gate. Tall trees mostly mangoes (*Mangifera indica*) and pipal (*Ficus religiosa*) are abundant on the north, south and west sides of the temple and the ground is covered with shrubs. There is also a big open area on the north. To the east of the temple is the residential area with permanent buildings and courtyards. Some devotees live in the temple area. There is constant human activity in the area particularly during the day time and there is a great rush of visitors to the temple on every Tuesday. The habitat can be classified as human habitation type. The areas of greatest activities of the monkeys are generally in the north, south and west of the temple covering an extent of about 8 hectares.

Methods

This group was studied for a few days in the months of May-June 1974 but the monkeys were observed from dawn to dusk in the month of February 1975. A total of about 70 hours was spent with this group. Group size, composition, intraspecific interactions, relation to man and dogs were recorded. It was possible to keep the group under constant observation from vantage points within the temple campus itself and to watch their daily routine and behaviour.

No attempt was made to interfere with the activities of the monkeys, nor was feeding resorted to except on one occasion. The young which were less than one year of age, usually

carried by their mothers and not yet weaned, were classified as infants. The juveniles were identified as young that were independent, weaned and about one or more than one year of age. The monkeys were neither marked nor trapped, individual identification was possible in most cases after a little familiarity and noting particular features, specially body-marking and other features. All the interactions between man and monkeys were recorded during the period of observations.

Results and Observations

Group size and composition The composition of this group in February 1975 was 18 adult males, 38 adult females, 42 juveniles and 30 infants, consisting a total of 128 monkeys. The ratio of adult males to adult females is 1 : 2.11, whereas the ratio of the infants to adult females is 1 : 1.27. Some of the members of the group are shown in the photograph. No change was observed in the composition

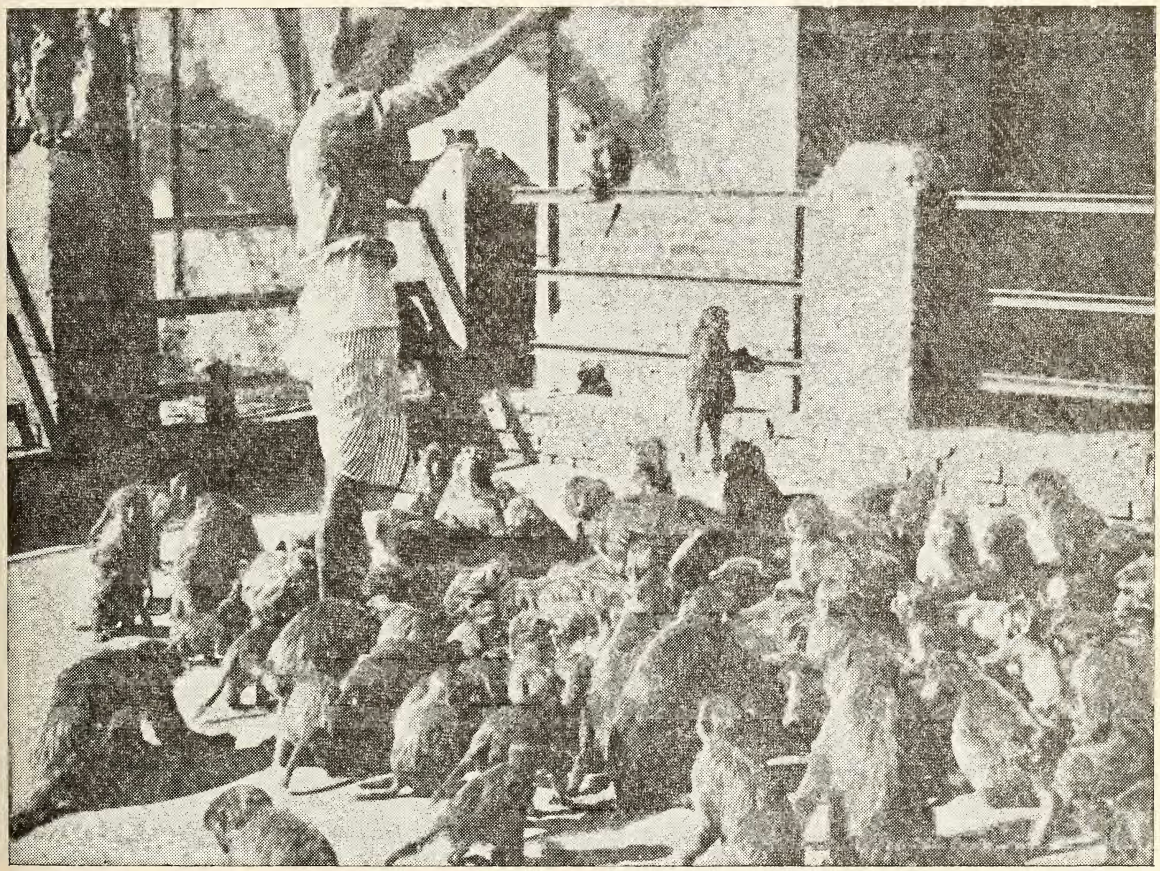

Photo. Monkeys waiting for food. Notice the clustering of the monkeys at artificial feeding time.

of the group during the period of study. The main centre of activities of the group was generally confined within the temple premises during the day time, and though occasionally some members moved, into the residential area on the eastern side, they were soon pushed back into the temple area by dogs and people. They were never observed to move out into the city and were always found in the temple area. Local people also confirmed these findings. The group maintained territorial boundaries and their home range covered an area of about 8 hectares with about 5 hectares as core area. Members used trees and roofs of the temple and other buildings inside the temple premises for sleeping during the night. About 60% of the area of the home range and about 50% of the core area were covered with trees. Though good portions of the core area and home ranges were covered with trees, yet the monkeys spent most of their daylight hours on the ground. They even spent less time on the roof of the houses or temple.

Daily activity and diet The monkeys were active throughout the day and were mainly engaged in feeding or moving from place to place in search of food, or indulging in intragroup agonistic behaviour. Play and resting, common among juveniles and adults of rhesus monkeys, were not much in evidence in this group. Occasionally the adult males were groomed for short period by adult females. The general activity of these monkeys tended to increase with the arrival of visitors in the temple when the monkeys cluster round the visitors and even search their belongings for food. A large number of monkeys moved together while searching for food and the members did not scatter over a wide area during the day. The natural food of these monkeys included leaves shoots and fruits of various plants. The visitors to the temple and devotees resident therein, however, contributed bulk of the food material which included fried grams, peanuts, and seasonal fruits. They also consumed grass blades and were also observed looking for food in the water of the tanks. The monkeys drank water two to three times a day, when they made individual or group movements to the two tanks.

Intragroup interactions It is generally held that inter- and intragroup agonistic behaviour are more common in baboons and rhesus than in other monkeys. Southwick (1962) reported on the intergroup agonistic behaviour of the temple macaques of Aligarh. Martin & Hilary Waterhouse (1971) observed a great amount of tension in rhesus monkeys at Bristol Zoo. Frequent agonistic encounters between members of the monkeys of Mahabali temple at Imphal were observed. These encounters consisted of hot chases, attacks, fights and bites; threats were less common than physical attacks. Even the sick and infants were not spared from these attacks. There was less agonistic behaviour between the males. The males generally attacked females, juveniles and even infants. These fights were quite severe, sometimes resulting in deep injuries to the victims. Most of the animals, even the infants, carried scars and deep wounds in various parts of the body. A female whose hind quarters were paralysed and thus rendered unable to move was subjected to repeated attacks by the males. These encounters occurred for food and when an animal approached too close to others. The males mostly initiated these encounters. When the visitors offered food the monkeys rushed to grab it, generally leading to severe encounters among the indiviudals. Tension in these monkeys was so high that individuals attacked others unprovoked. Most of the encounters were severe and usually started with two animals, but soon more ani-

mals joined in the frays and the interactions erupted into severe fights. In case of an attack by a male on a female, some time one or two females joined together and formed an alliance, and chased away the attacking male.

An average of 21.13 encounters were recorded per hour in these monkeys. The percentage of intragroup encounters are given in the Table below. The male-female encounter was more, whereas male-male encounter was less.

TABLE SHOWING PERCENTAGE OF INTRAGROUP ENCOUNTERS

Categories	Males	Females	Juveniles	Infants
Males	3.70	24.70	11.11	4.94
Females	11.11	9.89	9.89	6.12
Juveniles	—	1.23	9.89	7.42
Infants	—	—	—	—

It is apparent from the table that even the infants were not spared from the attacks of males, females and juveniles. In such attacks the infants depended for protection on their respective mothers.

Interactions with other species Interactions of these monkeys with humans and dogs were also investigated. In human-monkey encounters rocks were thrown at the monkeys, catapults were used, noises were made and sticks were waved in the air. The main idea of these encounters was to scare away the monkeys from the visitors and from food articles and, of play in the case of children just for fun. These encounters generally lasted for one to five minutes, but a few lasted as long as eleven to fifteen minutes. On an average 15 encounters per hour were observed. In these encounters 73.44% boys and 26.56% adults were involved. Usually two to three boys joined together, whereas the men were usually alone in the harassment of these monkeys. In such harassments the monkeys either climbed up the trees or on roofs, or ignored the threat and continued their normal activity.

Occasionally the dogs belonging to the local people chased and barked at the monkeys and these harassments continued from five to twenty minutes. In such encounters two or three dogs joined in chasing the monkeys.

Discussion

Field studies of free-ranging rhesus monkeys show that intergroup interactions are frequent, but little is known about the intragroup interactions of rhesus monkeys in an overcrowded situation such as in a temple habitat and their encounters with human beings when their home ranges and core areas overlap with human habitation. The rhesus group of Mahabali temple at Imphal, Manipur, consisted of 128 individuals whereas Southwick, Beg & Siddiqi (1965) counted a maximum number of 78 monkeys at Jagvedi Akhara Temple at Chitrakut with 17 males and 35 females. They gave the average group size of temple rhesus monkeys to be 41.9. They also found that the temple group on an average consisted of 7.9 adult males and 15.2 adult females. The present group consists of 18 adult males and 38 adult females. Unlike other temple monkeys they never move out in the other parts of the city. Very little is known about the rhesus population and their distribution in Manipur. Manipuris reported that in the past there were number of rhesus groups at Imphal, and other parts of Manipur but now owing to the expansion of city and the exploitation of their habitats, there are only a few left. It is likely that the existing Mahabali temple group is the remnants of the large population of rhesus monkeys of Imphal that used to exist in the

past before the destruction of their normal habitats. The food source and home range of this group is limited, there is no further chance to expand its home range owing to the residential area on the east, Imphal river on the west and the expansion of the city to the north and south. Further the group contained a large number of individuals resulting in over crowding and the number of adult males is much more than normal. All these factors build up high tension in the animals which leads to frequent and violent intragroup interactions. The intragroup encounters in this group are much more than what were reported by Martin & Hilary Waterhouse (1971) in zoo monkeys. Southwick, Beg & Siddiqi (1965) reported that adult males attacked other members of a group including the infants at the feeding time, whereas males of the Mahabali temple attacked group members during feeding and non-feeding times, and even unprovoked. Southwick (1967), and Alexander & Roth (1971) also observed that the aggressiveness in the captive groups of rhesus and Japanese macaques respectively increased under crowding conditions. Alexander & Roth further observed increase in aggressive interactions between the males under such conditions. The present field observations support the findings of Southwick, and Alexander & Roth, but in the Mahabali temple group the male-female encounters were much more than male-male bouts. Martin & Hilary Waterhouse (1971) reported great tolerance by the adult males towards the infants in the zoo monkeys. In this respect the present observation is at variance with that of Martin & Hilary Waterhouse.

Harassments by the adult humans to monkeys were caused for protection of food and property, whereas attacks by the boys were mainly for play. In man-monkey encounters boys were involved more than adults. This agrees with the findings of Oppenheimer (1973) who has reported that the langur groups in his study area were more harassed by dogs and children, than by adult humans.

Summary

The paper deals with the effects of overcrowding, intragroup interactions and human-monkey encounters of a group of rhesus monkeys *Macaca mulatta* (Zimmermann) inhabiting the Mahabali temple of Imphal, Manipur. The group comprised of 18 adult males, 38 adult females, 42 juveniles and 30 infants, a total of 128 animals. This large number of animals in a limited area leads to overcrowding which resulting in great tension in the animals with high degrees of intragroup interactions. In man-monkey encounters, boys figured more than adults.

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